



## DIETARY AND NUTRITIONAL STATUS OF CHILDREN FROM PRESCHOOL AGE IN EASTERN MACEDONIA

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### Abstract

Early childhood is the most vulnerable period in the development stage of man. During the first year of life the infant has an intense, fast growth and development. The period of childhood, from 1 to 5 years of age, is characterized by changes in the intensity of growth, body composition and changes in the energy and nutritional needs of the body. Good, healthy and balanced diet means the use of biologically valuable products that can meet the energy needs and provide a qualitative and quantitative intake of important nutrients. Aim of this work was to implement actions to assess the growth, development, nutritional status, physical health and prevention of disease, genetically modified foods and the impact of various products on health, policy and strategy of the EU's nutrition, anthropometric standards and detection groups with nutritional risk.

In the period 2013 - 2015, 109 preschool children from Kocani, Berovo, Pehcevo and Russinovo (municipalities in eastern Macedonia), were included in our research. Children population from investigated kindergartens from these municipalities in eastern Macedonia, were monitored and their growth and nutritional status were assessed. We used retrospective and descriptive epidemiological method and statistical data processing.

From the results we can conclude that only children in kindergarten "Pavlina Veljanova" Kocani (Branch 1) have a normal weight (18.5 kg to 24.9 kg), while in other kindergartens in Berovo, Pehcevo, Roussinovo as in Branch 3 in kindergarten "Pavlina Veljanova" Kocani the weight of children belongs in the classification malnutrition (< 18.5 kg).

The main features of the dynamic development of children in pre-school age, are changes in body composition and their rapid growth depends on healthy and balanced diet application. A diet that is given to

children in the kindergartens and the number of the meals are of great importance. Children in kindergartens from Kocani branch 1 receive 2 meals and 2 snacks for a stay of 8 hours, while children from other kindergartens and municipalities are receiving one meal and one snack during the stay of 6 hours, which is the main reason why children in these kindergartens are classified as malnourished.

**Key words:** *Preschool age, Nutritional status, Anthropometric standards.*

### 1. Introduction

Childhood in the preschool period is a crucial time for human growth, development and maturation, which are occurring through changes in the body. Monitoring and evaluation of the process of growth and development in that period is of particular importance. The connection of this period beginning with the biological maturation gives us the opportunity to implement specific actions aimed at preventing health problems. Many scientific findings point to the importance of nutritional deficiency during the developmental preschool period [8].

Proper nutrition under the Rules issued by the Ministry of Labor and Welfare [10] is:

- Appropriate to age and activity food total energy value.
- Food ingredients depending on age and activity.
- Proper mutual relationship between individual food compounds and the method of food preparation [1].

Food is the only source of energy in the human body. Even in preschool period children should be familiar with the proper pyramid of nutrition. Nutrition status

is a state of nutrition which depends on dietary intake of nutrients, and their use in body [5].

The number of infectious diseases in the world is reduced, and on behalf of the nutritional transition growing mass morbidity is resulting with chronic non-communicable diseases. These days, threats from obesity epidemic and excessive nutrition even in developed countries are accompanied with the health problems resulting from deficiency of certain ingredients in people nutrition. The lack of food in many countries is causing starvation, mineral and vitamin deficiency, poverty and short life span [2]. Statistics indicate that the diet in certain regions of the UK contains more energy as a result of increased intake of fat, but there is insufficient intake of vegetables, fruits, fish and milk [7].

In 1992, the USDA created a powerful icon: the Food Guide Pyramid, which was taught in schools, appeared in media articles, food labels and brochures. This pyramid was redesigned in 1996 and consisted 6 groups of foods that have been placed horizontally, in the way that on the bottom of the pyramid were cereals and cereal products. Over grains were placed fruit and vegetables [9]. Over fruits and vegetables in the same row were milk and dairy products and a derivative meat

and meat products. At the very top of the pyramid were the products of fats and oils and sweets, foods that should be consumed in a little quantity [3]. However, the information on which this pyramid was based on very slim scientific evidence. That's why in 2001, as an alternative to the USDA's nutrition advice, faculty members at the Harvard School of Public Health created first the Healthy Eating Pyramid [4]

US Department of Agriculture (USDA) in 2005 announced a new food pyramid. Numerous studies have been made of the USDA, gave new results on the nutritional content of individual foods and a need to create a new healthy eating pyramid. The new pyramid foods are arranged in vertical lines with colors of the rainbow. Thus, orange represents grains, green - vegetables, red - fruit, yellow - fats and oils - blue, while purple color is representing milk and meat and leguminous vegetables. For the first time on the new pyramid is displayed and human character, who climbs the stairs of the three-dimensional pyramid. It symbolizes the importance of regular physical activity for maintaining health [3].

Towards the end of the first year of a child's life, diet usually consists from three main meals and two snacks. In the second year of life physical growth slows down and energy needs of the body is decreasing. This is important to be known by the parents, because they cannot force children to eat more than they need, and because it can quickly lead to problems in feeding [7]. Also, children at that time are losing interest in some foods and flavors, and therefore parents should respect their child taste. Small meals that are taken quickly between main meals are also part of daily meals for the child [6].

Having all this in mind, the aim of this work was to implement actions to assess the growth, development, nutritional status, physical health and prevention of disease, genetically modified foods and the impact of various products on health, policy and strategy of the EU's nutrition, anthropometric standards and detection groups with nutritional risk.



Figure 1. Old Pyramid of healthy nutrition

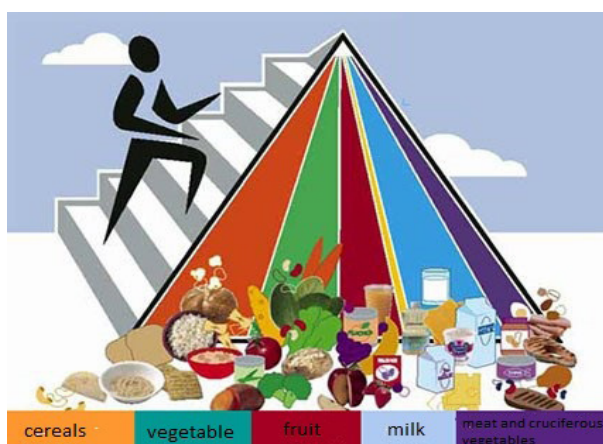


Figure 2. New Pyramid of healthy nutrition

## 2. Materials and Methods

In the period 2013 - 2015, 109 preschool children from Kocani, Berovo, Pehcevo and Russinovo (municipalities in eastern Macedonia), were included in our research. Children population from investigated kindergartens from these municipalities in eastern Macedonia, were monitored and their growth and nutritional status were assessed. We used retrospective and descriptive epidemiological method and statistical data processing. All activities for data collection and processing were performed by PHI "Health Home" - Kocani - Office for preventive health care.

### 3. Results and Discussion

The investigation was performed on population of 109 preschool children from Kocani, Berovo, Pehcevo and Roussinovo, all of them born in 2008 or 2009. Gender, height and weight distribution is presented in Table 1.

Figure 3 shows a percentile representation of children included in our research by kindergarten and municipality.

On Figures 4 and 5 are shown average height and weight of children included into this research from the kindergartens in Kocani, Berovo, Pehcevo, and Roussinovo.

Obesity is defined by body mass index (BMI) and is calculated by dividing the mass of the subject by the square of his or her height, typically expressed in metric units:  $BMI = kg/m^2$ . From the research results and calculations according BMI, following results were obtained:

- BMI of children in kindergarten in Kocani (Branch 1) is 21.46, meaning that children have normal weight.
- BMI of children in Berovo kindergarten is 15.26, which means that children are malnourished.
- BMI of children in Pehcevo is 14.92, which means they are malnourished.
- BMI of children in kindergarten in Roussinovo is 14.98, which means that children are malnourished.
- BMI of children in Kocani (Branch 3) kindergarten is 16.32, which means that children are malnourished.

### 4. Conclusions

- A diet that is given to children in the kindergartens and the number of the meals are of great importance.

- From the results we concluded that only children in kindergarten in Kocani (Branch 1) have a normal weight (18.5 to 24.9 kg), while in other kindergartens in Berovo, Pehcevo, Roussinovo as in the Kocani Branch 3 kindergarten children weight belongs in the classification malnutrition (< 18.5 kg).

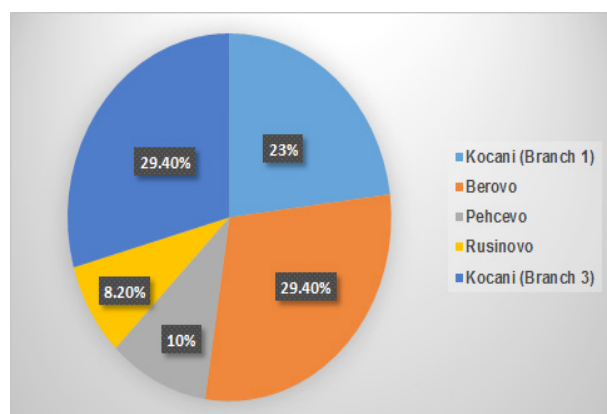
- There is a need for raising awareness and promoting access to information related to nutritional habits and proper nutrition in preschool children, as well as for unwanted disturbances that can occur as a result of nutritional imbalance. Healthy nutrition habits and sufficient physical activity should be a part of the daily life of every family [10].

### 5. References

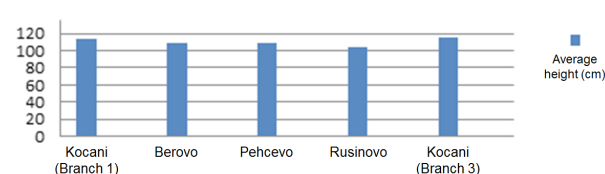
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**Table 1. Children in kindergartens born in 2008 and 2009**

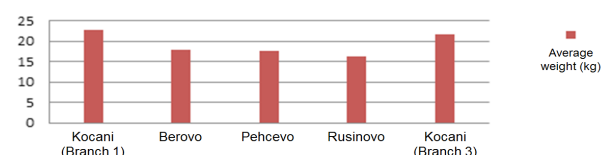
Parameters		Children born in 2009				Children born in 2008
		Kindergarten Kocani (Branch 1)	Kindergarten Berovo	Kindergarten Pehcevo	Kindergarten Rusinovo	Kindergarten Kocani (Branch 3)
Number of children	Male	13	20	6	3	17
	Female	12	12	5	6	15
Height (average, cm)		113.6	108.6	108.3	104.3	115.3
Weight (average, kg)		27.7	18	17.5	16.3	21.7



**Figure 3. Percentage of children by kindergarten**



**Figure 4. Children's height in the investigated kindergartens**



**Figure 5. Children's weight in the kindergartens**

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